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ABSTRACT

This document assesses college effects on earnings 8 to 10 years following graduation from high school. The sample group included male Wisconsin high school seniors in 1957 who had some college experience between 1957 and 1964 and who were alive, not enrolled in any school, and not on active duty with the armed forces in 1964. A total of 1198 men with college information available met the eligibility criteria. Results concerned: the variations in earnings from one school to the next; how these variations compare to institutional differences in the chances of graduating from college or entering a high-status occupation; the effect of institutional environment on earnings as compared to the effect of background, ability, or high school experiences; the extent of college differences in earnings; the mechanisms by which colleges affect earnings, and the effects of colleges on earnings as a reflection of differences in institutional quality. (MJM)

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COLLEGES AND EARNINGS[1]

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In the preceding analyses our discussions of the causes and consequences of education in the stratification process have concentrated on the quantity of education, expressed as years of schooling completed. Some scholars have argued that the quality of schooling must be considered as a separate factor in the stratification process. Although educational quality is hard to define, it is often believed to be an important factor in the later lives of those who attend college, especially in their socioeconomic careers (Jencks, 1968). Further, the quality of schooling is sometimes said to be represented by the college attended by a student, so inter-institutional differentials in the outcomes of schooling reflect differences in the quality of schooling.

Support for the hypothesis that colleges effect economic outcomes is often based on the early Time Inc. studies, which examined the relationship between the type of college attended and later monetary income (Babcock, 1941; Havemann and West, 1952). For the most part these studies are inadequate because they fail to control other theoretically relevant variables. Recently, a modest research literature on such effects has developed (Hunt, 1963; Weisbrod and Karpoff, 1968; Reed and Miller, 1970; Sharp, 1970; Daniere and Mechling, 1970; Solmon and Wachtel, 1971; Solmon, 1972; Wales, 1973; Kinloch and Perrucci, 1969; Laumann and Rapoport, 1968), and there is some support in this literature for the hypothesis of an unique effect of college quality on economic attainments.

In this chapter we examine the effects of colleges on the early earnings of men in the Wisconsin sample who attended college. The null hypothesis which guides the analysis is that the relationship between type of college attended and earnings is largely spurious, and when the

processes of selection and recruitment into different types of colleges are considered (Wegner and Sewell, 1970), the initial relationship will be considerably reduced. Alternatively, the choice of a college and its subsequent effect on earnings may reflect the influence of socioeconomic background or other prior variables on earnings, or colleges may introduce a component of variation in earnings which is unrelated to background and experience in secondary school. The following section treats the process of selection and recruitment in some detail, pointing to factors which should be controlled in the analysis of college effects on earnings. Then we review our research strategy and methods for assessing the presence of unique college effects in the Wisconsin data. Finally, we present our analysis of college effects on earnings and compare them with college effects on educational attainment and occupational status.

Selection and Recruitment Factors in College Choice

It is now widely recognized that college differences in economic outcomes may be due to the nonrandom allocation of students among colleges. For example, it is generally recognized that certain colleges actively seek out more able students or students with particular interests. The socioeconomic composition of student bodies obviously varies as well, and such selection and recruitment factors may be responsible for the relationship between college differences and socioeconomic achievements.

There are at least four major factors which select high school graduates into institutions of higher learning and allocate them differentially into colleges or colleges types: mental abiiity, academic performance, aspirations, and socioeconomic background. If these factors are not measured and controlled, their effects on achievement may wrongly be attributed to such college characteristics as intellectual environment, quality, or prestige.

Mental Ability: Higher learning has always been viewed in American society as an intellectual challenge requiring above average capacity. This general view is born out by the fact that colleges almost universally have adopted ability as a standard for admission when the demand for higher education has exceeded the supply (Jencks and Riesman, 1968; Wing and Wallach, 1971). The differences between college attenders and non-attenders on measured ability reflect both the requirements of the college educational experience and the academic standards which most colleges maintain for entrance. Such differences have been reported for a variety of time periods, populations and ability measures (Wolfle, 1954; Sewell and Shah, 1967; Folger, Astin and Bayer, 1970).

Furthermore, differences in average measured ability have been observed among individual colleges and colleges of different types (Wolfle, 1954; Wegner and Sewell, 1970; Cooley and Becker, 1966). Indeed, colleges are typically defined as being of higher quality if they enroll only students of high ability. Using data on colleges from the College Entrance Examination Board for the period 1965-1967, Wing and Wallach (1971) illustrate a positive relationship between the selectivity of an institution, as defined by Astin (1965), and the percentage of applicants it admits with higher verbal Scholastic Aptitude Test (SAT-V) scores. The high correlation between Astin's Selectivity Index and measured intelligence over individuals has been demonstrated by several investigators (Astin and Panos, 1969; Spaeth and Greeley, 1970; Folger et al., 1970).

High School Academic Performance: High school students who receive good grades are not only more likely to attend college, but are also more likely to graduate (Wolfle, 1954). High school grades have been one of the traditional standards for admission to college (Wing and Wallach, 1971).

As with measured intelligence, high school grades figure importantly in the differential selection and recruitment of students (Wegner and Sewell, 1970).

Aspirations: Regardless of a student's ability and academic performance, whether he wants to attend is a key factor in the ultimate decision to attend college (Wolfle, 1954). Sewell and Shah (1967) report a strong relationship between plans to attend college during the senior year in high school and actual college attendance during the next seven years. In addition to specific aspirations or plans regarding college attendance, there are other motivational sources of variation in college attendance. A number of studies have found that students educational or occupational aspirations vary with the quality of the college they attend (Wegner and Sewell, 1970; Spaeth, 1968b; Spaeth and Greeley, 1970).

Socioeconomic Background: Prior to the relatively recent emphasis on admission standards, when colleges were not pressed by large numbers of applicants, admission to a college, particularly a public institution, was a rather simple process. If a student had graduated from high school, could afford the expenses of college, and had the desire to attend, it was relatively easy to get into most institutions of higher learning. The net result of these circumstances was that college attendance depended highly on socioeconomic background. Apparently this situation still persists (Sewell and Shah, 1967; Folger et al., 1970). Colleges also differ in the investments they demand from their students in the form of tuition and fees, and to a large extent the ability to meet these costs depends on the financial well-being of the student's family (Jencks and Riesman, 1968:118). In addition to family income, other aspects of the family's socioeconomic standing are associated with the likelihood of attending

college, e.g., father's occupation and parents education (Wolfle, 1954; also see Chapter 3). The influence of socioeconomic background on the selection of students into different types of colleges has also been documented (Wegner and Sewell, 1970), and a number of studies report variations among colleges in the socioeconomic composition of their student bodies (Astin and Panos, 1969; Spaeth, 1968a, 1968b; Spaeth and Greeley, 1970; Karabel and Astin, 1972).

Religion and ethnicity are known to be important in the allocation of students among colleges (Astin and Lee, 1972), and they have also been shown to affect adult socioeconomic achievements (Duncan and Duncan, 1968; Featherman, 1971; Duncan and Featherman, 1972). These variables were left out of our analysis because we have no information on them, and for that reason our analysis may overstate the effects of some types of colleges.

The Research Problem

The literature on school effects suggests a theoretical model which draws attention to the fact that students are not randomly allocated to colleges. This model also underlies what sociologists refer to as contextual analysis (Hauser, 1970a) and certain studies of socialization, particularly adult socialization (Brim and Wheeler, 1966). Werts (1968) calls this the Input-Output model. The basic idea is that persons select themselves or are recruited differentially into groups, contexts, or social institutions, and are influenced, changed or marked in some way by differential association or by other unique organizational characteristics. In the case of colleges this effect may be due to differential socialization, certification or both (Jencks, 1968).

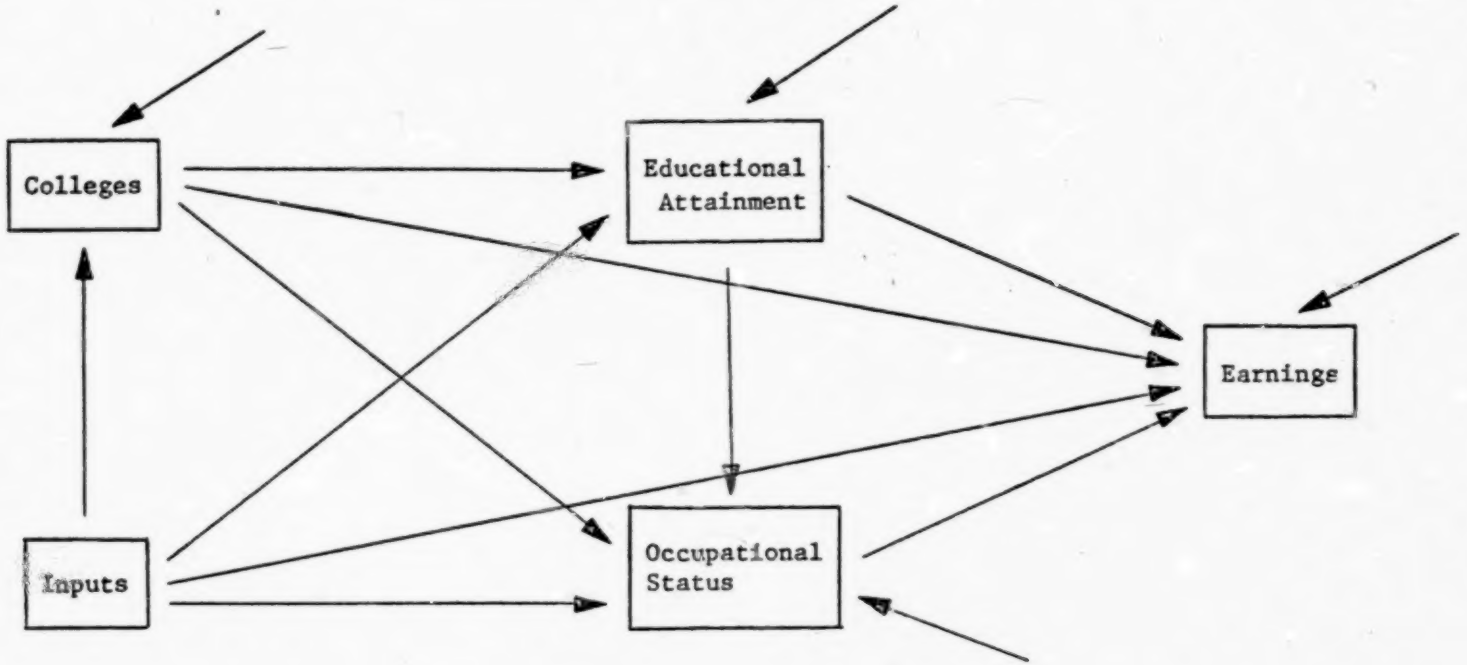
It is convenient to refer to the selection and recruitment factors discussed in the above section as inputs. The inputs partly determine both specific college attendance and later achievements, and in order to speak about a college effect it is essential that they be held constant. These causal specifications are described in Figure 5.1. The figure depicts a recursive model with the set of input variables as a major predetermined source of variation in later variables. The causal ordering in Figure 5.1 is consistent with the temporal ordering of the variables. The inputs occur prior to college attendance; the inputs and college experience both occur prior to the social achievements; educational attainment precedes both occupation and earnings; and occupation precedes earnings. The model permits us to ascertain the total (nonspurious) effects of colleges on earnings and, also, to measure the extent to which those effects are produced by way of educational and occupational achievement.

The Sample and Data

The analysis reported below assesses college effects on earnings eight to ten years following graduation from high school. These effects are estimated for the male sample of Wisconsin high school seniors in 1957 who had some college experience between 1957 and 1964 and who were alive, not enrolled in any school and not on active duty with the armed forces in 1964. A total of 1198 men with college information available meet the eligibility criteria set forth above. The several sources of data for this sample are discussed at length in previous chapters and will not be reviewed again.

While most of the variables used here are discussed in Chapter 2 and have been used previously in Chapters 3 or 4, for the sake of clarity we

Figure 5.1--A schematic causal model for the assessment of college effects



list the variables employed in our analysis. Four socioeconomic background variables are included: mother's education (M), father's education (V), father's occupational status (X) and father's average income (I_F).[2] Other input variables are mental ability (Q), rank in high school class (G), teachers encouragement to attend college (T), parents encouragement to attend college (P), friends college plans (F), educational aspirations (E), occupational aspirations (J), and several measures of commitment to college attendance. Variables treated as intervening between the inputs and economic outcomes are educational attainment (U) and occupational status (W) in 1964. Finally, annual earnings in 1965, 1966 and 1967 (Y_1, Y_2, and Y_3) are used as the major dependent variables in the analysis.

Our analysis uses twelve categories of colleges attended by the males in our sample. The first six of these categories represent single colleges or homogenous sets of colleges in the State of Wisconsin: University of Wisconsin, Madison; University of Wisconsin, Milwaukee; the University of Wisconsin Center System; the Wisconsin State Universities; the Wisconsin County Teachers Colleges; and Marquette University. The next four categories were created on the basis of a similarities analysis of 134 colleges and universities: Prestigious Colleges and Universities; Liberal Arts Colleges, General; Liberal Arts Colleges, Catholic Colleges; and Universities not in the other categories. For a complete discussion of the procedures used to classify these 134 colleges and universities see Alwin (1972:96-136). In brief, a matrix of similarity coefficients among the 134 schools was subjected to a Q-type factor analysis, and the classification was based on the resulting clusters of schools. The similarity coefficients were constructed from profiles on thirty-one college characteristics. The last two categories--Technological Colleges and Institutes and Other Colleges--were created

primarily on the basis of a priori considerations. The Technological category contains engineering colleges, art schools and military institutes. The final category is a residual group containing junior colleges, theological seminaries, business colleges and foreign colleges. In order to give the reader some feeling for the content of the college categories Figure 5.2 gives a partial listing of the schools in the larger groups. In the analysis of the effects of colleges on earnings we assigned each man to the category of the last college he attended.[3]

Analytic Strategy

Following the model of Figure 5.1 we have used multiple regression analysis to estimate and interpret college effects on earnings in 1965, 1966 and 1967. We treated earnings in the three years separately in order to detect possible changes over time in the determinants of earnings and in the quality of the earnings data.[4]

The first equations estimated for the earnings variables are straightforward dummy variable regressions in which eleven of the twelve college categories are entered as regressors. Based on these equations we present the gross college differences in the form of deviations from the grand mean of earnings in each year. The coefficients of determination (R^2) for these regression models provide an upper bound on the potential magnitude of the combined effects of all college characteristics on early earnings.

A second set of regression models was used to examine the functional form of possible college effects. Specifically we asked whether colleges modify the way in which input or intervening variables affect earnings, or whether the effects of other variables are much the same in any college category. In the latter case colleges can still affect earnings by means of an additive increment or decrement. This question can be answered

Figure 5.2--Examples of the classification of schools and colleges

Prestigious Colleges and Universities	Yale University, University of Chicago, Northwestern University, Carleton College, Dartmough College, Duke University, Beloit College, Lawrence College
Liberal Arts Colleges, General	Spring Hill College, Colorado State College, Lake Forest College, Carthage College, Valparaiso University, McNeese State College, Hope College, Macalester College, Abilene Christian College, Milton College
Liberal Arts Colleges, Catholic Colleges	Regis College, Loras College, St. John's University, Xavier University, Christian Brothers College, St. Norbert College
Universities	University of Alabama, University of Arizona, University of Colorado, Georgetown University, University of Illinois, Indiana University, University of Maryland, University of Michigan, Syracuse University, University of Oklahoma, Baylor University
Technological Colleges and Institutes	Georgia Institute of Technology, Rose Polytechnic Institute, Massachusetts Institute of Technology, Michigan College of Mining and Technology, Webb Institute of Naval Architecture, American Academy of Art, U. S. Naval Academy, U. S. Military Academy
Other	Moody Bible Institute, Sacred Heart Seminary, North Central Bible College, Baltimore College of Commerce, Fort Smith Junior College, Cisco Junior College, Guadalajara University, Conservatoire of Music-Paris

NOTE: For complete listing see Alwin (1972:Appendix A).

with a test for nonadditivity or statistical interaction. Following Gujarati (1970) the interaction terms entering the regression equations are created by multiplying a dummy variable for each of the college categories (less one) by each input or intervening variable in the equation, so there can be a unique slope in each college category. Thus, it takes eleven interaction terms to represent all possible interactions among the twelve college categories and each other variable in the equation. In a typical test for interaction we estimate two equations, one in which earnings are regressed on the college dummy variables and the input and intervening variables (covariates), and one in which earnings are regressed on the college dummies and covariates, plus the interaction variables for all covariates in the equation. We then compare the explained sums of squares in the two regression equations to determine whether there are statistically significant differences in slopes among the college categories.

A third set of regression equations is used to interpret the net (additive) effects of colleges on earnings. We estimate several regression models in sequential fashion, starting with socioeconomic background and academic ability as predetermined variables and systematically adding other input variables, college categories and intervening variables in subsequent models. By comparing the coefficients of input and intervening variables in these equations we determine the extent to which colleges effect the influence of input variables on earnings. The interpretive scheme follows that used in Chapters 3 and 4. Then, we use these same equations to derive the net effects of the college categories. A comparison of net effects with gross college differences tells us the extent to which the latter may be attributed to the input variables.

Gross College Differences in Earnings

College differences in earnings in 1965, 1966 and 1967 are displayed in Table 5.1 as deviations from the annual mean earnings in dollars and in standard deviations of the earnings distributions. There are substantial differences in earnings among the college categories, and these differentials appear to be consistent from one year to the next. Men who attended Technological colleges and institutes or Marquette University earned from $1000 to $1700 more than the average in each year, an advantage which placed them .38 to .55 standard deviations above the mean. Men who attended prestigious colleges and universities, other universities, or the University of Wisconsin-Madison enjoyed lesser advantages ranging from $450 to $870 per year, which placed their average student about one-fifth of a standard deviation above the grand mean. The University of Wisconsin-Milwaukee was very close to the average in all three years. Those who attended the University of Wisconsin, Center System, the Wisconsin State Universities, or either type of Liberal arts college had modest disadvantages ranging from about $300 to $600 per year, or 0.1 to 0.25 standard deviations less than the average. Finally, those who attended Wisconsin County Teachers Colleges or other colleges experienced large deficits in earnings of $750 to $1800 per year which placed them from a quarter to one-half a standard deviation below the average annual earnings.

In interpreting the differences in mean earnings it should be kept in mind that some of the college categories--especially the county colleges and other colleges--have very few sample cases. Further, despite the large differences in earnings we have just described, most of the variability in earnings occurs among men who attended the same school. Only 4.5 to 5.5 percent of the variance in earnings can be attributed to

Table 5.1--Earnings by type of college attended: male Wisconsin high school graduates of 1957 with college experience

College category	Sample Size	Deviations from grand mean					
		1965		1966		1967	
		Dollars	St. Dev.	Dollars	St. Dev.	Dollars	St. Dev.
University of Wisconsin, Madison	205	558	.206	574	.178	868	.239
University of Wisconsin, Milwaukee	108	- 11	-.004	278	.086	- 7	-.002
University of Wisconsin, Center	43	- 273	-.101	- 332	-.103	- 352	-.097
Wisconsin State Universities	359	- 436	-.161	- 488	-.152	- 638	-.176
Wisconsin County Teachers Colleges	15	- 753	-.277	-1438	-.447	-1828	-.504
Marquette University	72	1041	.383	1249	.388	1711	.472
Prestigious Colleges and Universities	28	456	.168	644	.200	330	.091
Liberal Arts Colleges, General	101	- 663	-.244	- 753	-.234	- 603	-.166
Liberal Arts Colleges, Catholic	38	- 441	-.162	- 598	-.186	- 476	-.131
Universities	54	866	.319	690	.214	591	.163
Technological Colleges and Institutes	39	1486	.547	1352	.420	1274	.351
Other Colleges	19	-1387	-.511	- 863	-.268	-1343	-.370
Total sample size	1081	1121		1123		1119	
Grand mean		6199		7246		7916	
Standard deviation		2716		3218		3626	
Coefficient of determination (R^2)		.055		.044		.051	

NOTE: Data pertain to male Wisconsin high school graduates of 1957 with college experience between 1957 and 1964 who were alive and not in school or in the military in 1964. Sample size reported for each college category is the number of cases for which nonzero earnings were reported in all three years, 1965-1967.

attending different types of colleges at this early stage in the socio-economic career. Still, we think these inter-institutional differences in earnings are large enough to warrant our further analysis of them.

Interaction Effects

Table 5.2 summarizes a large number of statistical tests of differences among college categories in the effects of input and intervening variables on earnings in 1965 through 1967. The results of these tests are entirely consistent; they give no evidence that input or intervening variables have different effects in different college categories. For example, panel 1 gives the explained proportions of the sums of squares of earnings--both in the sample (R^2) and corrected for loss of degrees of freedom ($\bar{R}^2$)--from regressions of 1965, 1966, and 1967 earnings on socioeconomic background, ability, and the college categories. Panel 2 contrasts these results with more complicated regression equations which permit socioeconomic background and ability to interact with the college categories. The model of panel 1 accounts for 9.5 percent of the variance in 1967 earnings, while the corresponding interaction model accounts for an apparently much larger 15.2 percent of the variance. However, it takes 55 degrees of freedom to produce this increment of 5.8 percentage points in the explained variance, and the very low F-ratio (1.0138) for the contrast between additive and interaction models indicates that an increment this large could easily have occurred by chance. Indeed, when the percentages of variance explained in the additive and interactive models are adjusted for loss of degrees of freedom, they are virtually the same: 7.8 percent and 7.9 percent, respectively.

In panels 3 through 8 of Table 5.2 this analysis is extended to interaction effects of college types with academic performance and

Table 5.2--Tests for interaction effects of college categories and inputs on 1965-67 earnings

Independent variables		R^2	$\bar{R}^2$	Increment in R^2	F-ratio	Degrees of freedom
1. Socioeconomic background, ability and colleges	1965	.064	.047			
	1966	.067	.050			
	1967	.095	.078			
2. (1) plus interactions involving background and ability	1965	.136	.061	.071	1.2266	55,818
	1966	.124	.048	.057	.9696	55,818
	1967	.152	.079	.058	1.0138	55,818
3. (1) plus academic performance and aspirations	1965	.074	.054			
	1966	.077	.057			
	1967	.114	.095			
4. (3) plus interactions involving academic performance and aspirations	1965	.106	.051	.032	.9083	33,837
	1966	.108	.053	.032	.8949	33,837
	1967	.147	.094	.033	.9735	33,837
5. (3) plus education	1965	.077	.056			
	1966	.079	.057			
	1967	.118	.098			
6. (5) plus interactions involving education	1965	.084	.050	.007	.5489	11,858
	1966	.088	.055	.009	.7939	11,858
	1967	.130	.099	.013	1.1171	11,858
7. (5) plus occupation	1965	.101	.080			
	1966	.094	.072			
	1967	.132	.111			
8. (7) plus interactions involving occupation	1965	.112	.079	.011	.9226	11,857
	1966	.106	.073	.012	1.0581	11,857
	1967	.150	.119	.018	1.6784	11,857

NOTE: Data pertain to male Wisconsin high school graduates of 1957 with college experience between 1957 and 1964 who were alive and not in school or in the military in 1964 with all data present (N = 890).

aspirations, educational attainment, and occupational status. In no case do the effects of these variables on earnings in any year differ significantly among the college categories. Thus, our analysis suggests that the effects of socioeconomic background, ability, and high school experiences on post-high school earnings are not significantly modified by the type of post-secondary school which a young man attends. Rather, this aspect of socioeconomic achievement exhibits a remarkable homogeneity across diverse types of schools, colleges and universities.

College Type as an Intervening Variable

Since we found no evidence that type of college interacts with the other causes of earnings, we now look at several additive models of earnings. The findings in 1965, 1966, and 1967 are so similar that we have chosen to present only the results for 1967.[5] Table 5.3 gives standardized and unstandardized regression coefficients of earnings on input and intervening variables. Each odd-numbered column gives coefficients of a regression equation in the variables indicated, and the following even-numbered column gives the coefficients of the same variables in an equation where the college categories have been added as regressors. (We shall compare gross and net effects of the college categories in a later section.)

In column 1 we see that parents education (V and M) and father's occupation (X) have no effect on son's 1967 earnings. As in the more inclusive sample treated in Chapter 4, income is the only socioeconomic characteristic of the family of orientation which affects son's earnings a decade after high school graduation. In this case a thousand dollar shift in father's income (I_F) leads to a $125 shift in son's earnings, net of ability and other socioeconomic background variables. Even in this college-going sample, mental ability (Q) appears to have a modest effect

Table 5.3--Regression models for 1967 earnings: male Wisconsin high school graduates of 1957 with college experience

Predetermined variables	Model 1	2	3	4	5	6	7	8	9	10	11	12
	Regression coefficients in standard form											
V	-.0105	-.0024	-.0062	.0001	-.0092	-.0030	-.0132	-.0065	-.0166	-.0098	-.0215	-.0155
M	.0237	.0290	.0218	.0302	.0149	.0251	.0185	.0268	.0141	.0237	.0172	.0246
X	.0318	.0136	.0401	.0196	.0317	.0119	.0285	.0109	.0247	.0066	.0210	.0042
I_F	.1657*	.1532*	.1684*	.1582*	.1639*	.1546*	.1611*	.1531*	.1602*	.1537*	.1567*	.1485*
Q	.0749	.0365	.0109	-.0052	.0030	-.0124	-.0126	-.0240	-.0184	-.0303	-.0243	-.0361
G			.1193*	.0865*	.1060*	.0737	.0919*	.0641	.0656	.0379	.0583	.0320
T					.0189	.0251	.0131	.0196	.0121	.0186	.0004	.0079
P					.0594	.0531	.0476	.0441	.0468	.0426	.0411	.0376
F					.0371	.0364	.0236	.0255	.0135	.0157	.0070	.0089
E							-.0624	-.0559	-.0692	-.0615	-.0641	-.0572
J							.1551*	.1312*	.1502*	.1249*	.1333*	.1115*
U									.0819*	.0875*	.0055	.0177
W											.1710*	.1552*
R^2	.0437	.0780	.0539	.0828	.0601	.0865	.0746	.0985	.0796	.1040	.0998	.1202

Continued

Table 5.3--continued

Predetermined variables	Model 1	2	3	4	5	6	7	8	9	10	11	12
	Regression coefficients											
Constant	445.23	442.73	276.63	326.41	62.03	127.31	88.76	140.79	-59.54	-27.14	152.08	180.28
V	-1.18	-.27	-.70	.02	-1.04	-.34	-1.48	-.73	-1.86	-1.10	-2.42	-1.74
M	2.76	3.37	2.54	3.51	1.73	2.92	2.16	3.11	1.64	2.75	2.00	2.86
X	.49	.21	.61	.30	.49	.18	.44	.17	.38	.10	.32	.06
I_F	.1258*	.1163*	.1278*	.1200*	.1244*	.1173*	.1222*	.1162*	.1216*	.1167*	.1189*	.1127*
Q	2.07	1.01	.30	-.14	.08	-.34	-.35	-.66	-.51	-.84	-.67	-1.00
G			3.35*	2.43*	2.98*	2.07	2.58*	1.80	1.84	1.07	1.64	.09
T					14.15	18.72	9.78	14.65	9.04	13.90	.33	5.89
P					62.66	56.03	50.17	46.47	49.32	44.94	43.35	39.63
F					27.36	26.82	17.40	18.75	9.92	11.53	5.13	6.53
E							-52.94	-47.42	-58.71	-52.14	-54.43	-48.54
J							2.56*	2.16*	2.48*	2.06*	2.20*	1.84*
U									18.24*	19.48*	1.22	3.94
W											2.73*	2.48*

NOTE: Variables are V=father's education, M=mother's education, X=father's occupational status, I_F=father's income, Q=mental ability, G=rank in high school class, T=teachers encouragement, P=parents encouragement, F=friends college plans, E=college plans, J=occupational status aspirations, U=educational attainment, W=occupational status attainment. Data pertain to male Wisconsin high school graduates of 1957 with college experience between 1957 and 1964 who were alive and not in school or in the military in 1964. Estimates were made from a correlation matrix based on pairwise-present data. In no case were correlations based on fewer than 964 cases. All even-numbered models differ from the preceding odd-numbered models by the inclusion of the college categories, but regression coefficients of the college categories are not shown here.

on son's earnings, $207 for each ten point shift in ability, but this effect is not quite large enough to be statistically significant.

By comparing the entries in column 2 with those in column 1 we can contrast the total effects of socioeconomic background and ability on earnings with their effects net of college type. When the college categories are added to the regression of earnings on socioeconomic background and ability the percentage of variance explained increases from 4.4 percent to 7.8 percent, an increment which is two-thirds as large as the total percentage of variance between types of colleges. Thus, differences among college categories in the mental ability and socioeconomic background of their matriculants account for about a third of the variance in earnings among college types. There is only a minor (8 percent) reduction in the coefficient of father's income between columns 1 and 2, so greater financial resources do not increase a son's earning power by facilitating a propitious choice among colleges. Net of college type a thousand dollars of father's income is still worth $116 in son's 1967 earnings. At the same time the type of college attended does account for much of the effect of ability on earnings. Of the $200 shift in income effected by a ten point shift in ability, about $100 is explained by the selection of brighter students into types of colleges whose matriculants later enjoy higher earnings.

Column 3 of Table 5.3 shows the regression of son's 1967 earnings on socioeconomic background, ability and high school grades (G). The addition of academic performance to the equation accounts for almost all of the effect of mental ability on earnings (compare columns 1 and 3), but none of the effect of father's income. In fact father's income has a marginally greater effect on son's earnings after high school grades

have been entered into the equation, presumably because the selection of a college-going subsample sets up a modest negative association between socioeconomic background and high school academic performance (Campbell, 1973). Still, none of the other socioeconomic background measures has a significant effect on earnings.

We did not ascertain high school grades as such, but rather obtained percentile ranks in class. These were transformed into the same metric as IQ scores, so they had a mean of 100 and a standard deviation of 15 in the total population of high school seniors. Thus, the effects of academic performance are in a metric which is strictly comparable to that of ability.

Each ten point increase in high school grades (G) on our scale gives rise to a $335 increase in 1967 earnings, after the effects of ability and socioeconomic background have been taken into account. When the college categories are again added to the earnings equation (column 4), the coefficient of father's average income is barely affected, but that of grades is reduced from $335 to $243 per ten point shift in performance. Thus, about a quarter of the higher earnings of college-going men with superior high school grades can be attributed to their attending types of colleges which enhance earning capacity at the outset of the socio-economic career. The college categories add 2.9 percentage points to the explained variance in 1967 earnings net of socioeconomic background, ability, and academic performance in high school. Thus, an additional tenth of the variance in 1967 earnings among college types, which is not accounted for by background and ability differences, can be explained by variability among colleges in the high school grades of their students.

In column 5 our measures of teachers (T) and parents (P) encouragement to attend college and friends college plans (F) are added to the model without the college categories. While the effects of these three dichotomies are substantial in terms of dollars, especially in the case of parents encouragement, none of them is statistically significant at even the .05 level, nor do the three measures collectively add a statistically significant increment to the explained sum of squares. Consequently, adding those variables to the model does not alter the coefficients of father's average income or of academic performance. Likewise, adding the college categories to the model (column 6) does not materially affect the coefficients of the three measures of significant others influence, and the contribution of the college categories to the explained variance is essentially the same here (2.8 percentage points) as in the model of column 4. That is, college differences in perceived levels of social support for college attendance do not contribute anything to the explanation of college differences in earnings. In interpreting these null findings, it should be kept in mind that our measures of perceived social support refer specifically to college-going and not to other facets of social or economic success.

In columns 7 and 8 educational (E) and occupational (J) aspirations are added to the model. Educational aspiration has a nonsignificant negative coefficient in this sample of college-going youth, but occupational aspiration does have a substantial positive impact on earnings. Net of prior variables each ten point shift in occupational aspiration on the Duncan scale effects a shift of more than $250 in 1967 earnings. Thus, the effect of occupational aspiration among these college-going men is about two and a half times larger than its effect

in the sample of all high school graduates of nonfarm origin (see Table 4.3). While occupational aspiration influences earnings to an important degree, it does not serve to mediate the effects of father's income or of high school academic performance (compare columns 5 and 7). In this sample of college-going men the relationship between occupational aspiration and earnings is largely independent of father's income, ability, and performance in high school. When the college categories are added to the equation for 1967 earnings, the effect of occupational aspiration on earnings is reduced by one-sixth to $216 per ten point shift on the Duncan SEI scale, so the allocation of men among types of colleges is not strongly implicated in the effect of occupational aspiration on earnings. Again, we are impressed by the size of the total effect of occupational aspiration on earnings because the survey item was not narrowly directed to aspirations for pecuniary success.

The college categories add 2.4 percentage points to the explained variance in 1967 earnings net of background, ability, grades, significant others influence, and aspirations, so those input variables collectively account for just half of the variance in earnings among college types. Obversely, half the observed variance in earnings among college types might be attributed to true effects of institutional types, and the remainder is a spurious consequence of the differential allocation of students among colleges. Since we have great confidence in the accuracy of our data on college attended, while our specification of effects of input variables is subject to error because of omitted variables and random measurement error, we think that we are more likely to have

over-estimated than to have under-estimated the net effects of the college categories.

This completes our analysis of the ways in which college categories mediate the effects on earnings of socioeconomic background, ability, and high school experiences. To summarize, of the several variables in our linear model of socioeconomic achievement only three have substantial and statistically significant effects on 1967 earnings in this sample of men with collegiate experience. These are father's average income during 1957-60 (I_F), academic performance in high school (G), and occupational aspiration during the senior year of high school (J). To a modest degree the effects of these variables on earnings are brought about by the differential selection and recruitment of students among colleges whose graduates later experience earning differentials. Less than one-tenth of the effect of father's income, about a quarter of the effect of academic performance, and a sixth of the effect of occupational aspiration are mediated by the type of college attended. At the same time these and the other input variables do account for more than half of the variance among college categories in son's 1967 earnings. While 5.1 percent of the variance in 1967 earnings occurs among college types, only 2.4 percentage points are explained once the effects of the input variables have been taken into account. Thus, we might think of the net effects of colleges on earnings as small relative to the total variability in the earnings of college-going men, but large relative to our ability to specify the factors affecting earnings early in the socioeconomic career.

From the last four columns of Table 5.3 we can determine the extent to which colleges effects on earnings are brought about by differentials in years of schooling and in occupational achievement. In column 9 of Table 5.3 we add educational attainment (U) to the regressors of son's 1967 earnings. In this sample of men with college experience each year of post-high school education leads to an increase of $182 in 1967 earnings. At the mean of the earnings distribution this is an increase of just over two percent in earnings for each additional year in school. While this is a low return relative to rates commonly reported by economists of education, we do not think it is surprising, given the restrictions on our sample, their limited labor force experience, and our thorough specification of factors affecting both schooling and earnings. Years of schooling account for about a third of the net influence of academic performance on earnings (compare columns 7 and 9), but schooling does not account for the effects of father's income or of occupational aspiration.

When the college categories are added to the earnings equation (column 10), the coefficient of earnings increases slightly to $195 per year of schooling. That is, there is a modest tendency for men with more schooling to have attended colleges with depressing effects on earnings. Likewise, the college categories add slightly more to the explained sum of squares in the model of column 10 than in that of column 8. Some colleges are more likely than others to hold their matriculants until graduation (Wegner and Sewell, 1970; Alwin, 1972), but the greater or lesser holding power of colleges clearly does not account for their effects on earnings.

When we add occupational status (W) to the regression of 1967 earnings on the input variables and educational attainment (column 11 of Table 5.3), we find that each ten points on the Duncan scale is worth $273 in earnings. This is more than twice the payoff of occupation in the sample of nonfarm men with or without college experience (see Table 4.3, line 38). At the same time the returns to occupational status in 1964 are scarcely larger than the total effect of the occupational aspiration reported in 1957 (compare columns 7 and 11 of Table 5.3). The higher status occupations of men with more education account for almost all of the effect of educational attainment on earnings, but occupational status accounts for few of the effects of the other input variables on earnings (compare columns 9 and 11). Finally, when the college categories are added to the earnings equation, the coefficient of occupational status falls by less than 10 percent (compare columns 11 and 12). Thus, the modest effects of colleges on earnings are not explained either by differences in their capacity to hold students until graduation or by the higher or lower status jobs of their graduates. Other mechanisms must be invoked to explain the effects of colleges on earnings. As a prelude to further explorations of this issue, we now turn to a detailed examination of the effects of the college categories on earnings.

College Types and Earnings

Gross and net differences among the college categories in 1967 earnings are displayed in Table 5.4 Again, the results in 1965 and 1966 are so similar that we have chosen not to present them here. The entries in the table are deviations of the average earnings in each college category from the grand mean of the 1967 earnings distribution.

Table 5.4--Gross and net college differences in 1967 earnings: male Wisconsin high school graduates of 1957 with college experience

College category	Deviations from grand mean					
	Unadjusted		Adjusted on V,M,X,I_F,Q		Adjusted on V,M,X,I_F, Q,G,T,P,F,E,J	
	Dollars	St. Dev.	Dollars	St. Dev.	Dollars	St. Dev.
University of Wisconsin, Madison	868	.239	746	.206	533	.147
University of Wisconsin, Milwaukee	- 7	-.002	64	.018	58	.016
University of Wisconsin, Center	- 352	-.097	- 114	-.031	- 146	-.040
Wisconsin State Universities	- 638	-.176	- 370	-.102	- 360	-.099
Wisconsin County Teachers Colleges	-1828	-.504	-1139	-.314	- 900	-.248
Marquette University	1711	.472	1571	.433	1330	.367
Prestigious Colleges and Universities	330	.091	- 498	-.137	- 751	-.207
Liberal Arts Colleges, General	- 603	-.166	- 642	-.177	- 665	-.183
Liberal Arts Colleges, Catholic	- 476	-.131	- 524	-.145	- 372	-.103
Universities	591	.163	536	.148	543	.150
Technological Colleges and Institutes	1274	.351	1358	.375	1057	.292
Other Colleges	-1343	-.370	-1109	-.306	- 812	-.224
Grand mean	7916					
Standard deviation	3626					

NOTE: Variables are F=father's education, M=mother's education, X=father's occupational status, I_F= father's income, Q=mental ability, G=rank in high school class, T=teachers encouragement, P= parents encouragement, F=friends college plans, E=college plans, J=occupational status aspirations. Data pertain to male Wisconsin high school graduates of 1957 with college experience between 1957 and 1964 who were alive and not in school or in the military in 1964. Estimates were made from a correlation matrix based on pairwise-present data. In no case were correlations based on fewer than 964 cases. All even-numbered models differ from the preceding odd-numbered models by the inclusion of the college categories, but regression coefficients of the college categories are not shown here.

The deviations from the grand mean are expressed both in dollars and in units of the standard deviation of earnings.

The first pair of columns gives the gross or unadjusted deviations which were reported earlier in Table 5.1. In the second pair of columns the deviations have been adjusted to take account of the variation among college categories in socioeconomic background and ability. That is, the entries in the second pair of columns are coefficients of the college categories in the regression equation of Table 5.3, column 2. In the last pair of columns the deviations have been adjusted for all of the input variables, so the entries are coefficients of college categories in the regression equation of Table 5.3, column 8.

Recall that the adjustments for input variables do account for a large share of the variance in 1967 earnings among the college categories. Unadjusted college differences accounted for 5.1 percent of the variance in 1967 earnings, but the college categories explained 3.4 percent of the variance in earnings net of socioeconomic background and ability and only 2.4 percent of the variance in earnings net of all of the input variables.

As one would expect from these earlier findings, the adjusted deviations among the college categories are generally smaller than the gross deviations. At the same time they show the same pattern of sign and magnitude as the gross deviations. For example, on a gross basis men who last attended the University of Wisconsin, Madison had an advantage of $868 in 1967 earnings. Of this advantage $335 could be explained by the favorable distributions of Madison students on the input variables, but still the average Madison student earned $533 more than the average of all students. The $1711 advantage of men who attended Marquette University fell to $1330 after adjustment for the input variables, but

men from Marquette remained the most advantaged earners in both the gross and adjusted distributions. Similarly, about $200 of the advantage of men from technological colleges and institutes was explained by the input variables, but they still earned $1000 more than average.

At the other extreme about half of the $1828 earnings disadvantage of men who attended Wisconsin County Teachers Colleges was explained by their unfavorable distribution on the input variables. Similarly, $500 of the $1343 disadvantage of men who attended "other colleges" were explained by their distribution on the input variables. Still, these two categories had the lowest average earnings after adjustment, just as they did before adjustment.

There was one major discrepancy between the gross and adjusted earnings. Before adjustment men who attended prestigious colleges and universities earned $330 more than average, but after adjustment for the input variables they earned $750 less than average. This is less than the adjusted earnings in any college category except the Wisconsin County Teachers Colleges and the "other colleges."

The pattern of adjusted deviations in Table 5.4 only partly confirms the notion that college effects on earnings follow the prestige ranking of institutions. Such a pattern is plainly evident in both the gross and adjusted deviations of public institutions in Wisconsin where the University of Wisconsin, Madison ranks first, followed by the UW-Milwaukee campus, the Center System, the Wisconsin State Universities (formerly normal schools) and the Wisconsin County Teachers Colleges in that order. At the same time institutional prestige cannot explain the very high earnings of men from Marquette University and from technological colleges and institutes, nor can it explain the low earnings of men from the prestigious

colleges and universities. Indeed, it is difficult to think of any unidimensional classification of the college types which could yield a nontautological explanation of the net differences in earnings among the college categories.

College Effects on Education, Occupation and Earnings

By comparing college effects on earnings with those on educational attainment and occupational status we can obtain further insights about the magnitude of college differences in earnings and, also, about the meaning of college quality as an explanatory construct. In the sample of men with college experience there is more variability among colleges in the educational attainments of their matriculants and less variability in their occupational statuses than in their earnings. Seven and eight-tenths percent of the variance in years of schooling and 4.6 percent of the variance in occupational status occurs among the college categories, compared with 5.1 percent of the variance in 1967 earnings which occurs among the college categories.

The several input variables account for 70 percent of the between-category variance in educational attainment, 46 percent of the between-category variance in occupational status, and 53 percent of the between-category variance in 1967 earnings. Thus, half or more of the observed variance among college types in each of the socioeconomic outcomes may be attributed to the joint dependence of the type of college attended and the outcome variable on the causally prior input variables. The college categories account for between 2.25 percent and 2.50 percent of the variance in each outcome variable above and beyond the effects of the input variables. Since the input variables alone explain 27.0 percent

of the variance in educational attainment and 16.6 percent of the variance in occupational status among the college-going men, but only 7.5 percent of the variance in 1967 earnings, the net effects of the colleges on earnings represent a much larger share of the explained variance than in the case of the two prior outcomes of schooling.

Table 5.5 gives gross and adjusted differences among the college categories in educational attainment and in occupational status. These are expressed as deviations from the grand mean both in raw units of years of schooling or points on the Duncan scale and in standard deviation units. The adjusted deviations in years of schooling and in occupational status are comparable to the adjusted deviations in 1967 earnings reported in the last two columns of Table 5.4.

The gross differences in years of schooling among the college categories range from a high of 1.4 years more than average for men from prestigious colleges and universities to a low of about 0.7 years below average in the University of Wisconsin Center System and Wisconsin County Teachers Colleges. The lower attainments of men in the last two categories are not strictly determined by their two-year programs, since men were classified by the first college they attended in the analyses of educational attainment. Men who first attended the University of Wisconsin, Madison, Marquette University, or one of the technological colleges averaged about 0.4 to 0.5 more years of schooling than the average, and men attending the liberal arts colleges obtained about 0.25 more years of schooling than the average. Men from the Wisconsin State Universities and the "other colleges" spent about a quarter of a year less in school than the average, while those attending the University of Wisconsin, Milwaukee, obtained half a year less than the average.

Table 5.5--Gross and net college differences in educational attainment and occupational status: male Wisconsin high school graduates of 1957 with college experience

College category	Deviations from the grand mean							
	Educational attainment				Occupational status			
	Gross		Adjusted		Gross		Adjusted	
	Years	Std.Dev.	Years	Std.Dev.	SEI	Std.Dev.	SEI	Std.Dev.
University of Wisconsin, Madison	.40	.24	-.09	-.06	6.7	.30	1.8	.08
University of Wisconsin, Milwaukee	-.57	-.35	-.54	-.33	-4.0	-.18	-2.7	-.12
University of Wisconsin, Center	-.73	-.45	-.55	-.34	-13.0	-.57	-9.6	-.42
Wisconsin State Universities	-.23	-.14	-.08	-.05	-2.3	-.10	0.6	.03
Wisconsin County Teachers Colleges	-.70	-.43	.22	.13	-6.2	-.27	5.1	.23
Marquette University	.54	.33	.02	.01	8.4	.37	4.3	.19
Prestigious Colleges and Universities	1.41	.86	.40	.25	-0.4	-.01	-11.3	-.50
Liberal Arts Colleges, General	.27	.17	.11	.07	-0.5	-.02	-0.8	-.03
Liberal Arts Colleges, Catholic	.28	.17	.39	.24	-3.6	-.16	-0.6	-.03
Universities	-.15	-.09	-.14	-.09	-2.1	-.09	1.6	.07
Technological Colleges and Institutes	.42	.26	.12	.07	6.9	.30	6.8	.30
Other Colleges	-.26	-.16	.33	.20	-10.2	-.45	-3.9	-.17
Grand mean			15.08				56.54	
Standard deviation			1.63				22.68	

NOTE: Adjusted deviations from the grand mean are effects of the college categories net of socioeconomic background, mental ability, high school grades, significant others influence, educational and occupational aspirations, and perceived value of college attendance. In the analysis of educational attainment men were assigned to the category of the first college they attended. Data pertain to male Wisconsin high school graduates of 1957 with college experience between 1957 and 1964 who were alive and not in school or in the military in 1964.

Adjustment for the input variables markedly affected the deviations of some college categories from the grand mean of educational attainment. Men who first attended the University of Wisconsin, Madison, obtained slightly less schooling than predicted from their distribution on the input variables. The educational advantage of men who attended the most prestigious schools remained after adjustment, but it was a full year less than the unadjusted deviation. On the other hand, while men who attended Wisconsin County Teachers Colleges and "other colleges" obtained less schooling than the average, they obtained more schooling than expected, given their distribution on the input variables.

Men who last attended the University of Wisconsin, Madison, Marquette University, or the technological colleges and institutes enjoyed a 7 to 8 point advantage in occupational status relative to the grand mean. Men from the University of Wisconsin Center System, the Wisconsin County Teachers Colleges or the "other colleges" held occupations 6 to 13 points below the average in status. The remaining college categories were scattered between these extremes.

In the case of occupational status the pattern of adjusted deviations from the grand mean was generally similar to that of the gross deviations. After adjustment for the effects of input variables the major shifts were the elimination of the apparent disadvantage of students attending the Wisconsin County Teachers Colleges and the elimination of much of the apparent advantage of men from the University of Wisconsin, Madison, and Marquette University. Further, while men from prestigious colleges and universities were near the average in occupational status, they averaged about 11 points lower than expected on the Duncan scale.

In comparing these findings about educational attainment, occupational status, and earnings it is a striking fact that the adjusted deviations for the 12 college categories are not consistent across outcome variables. For example, after controlling input variables, men who attended Wisconsin County Teachers Colleges obtained more schooling and held higher status jobs than the average, but they also had lower than average earnings. Conversely, men from Marquette University or the technological colleges and institutes were close to the average in years of schooling, but they obtained higher status jobs and higher earnings than the average.

To measure the degree of consistency in the net effects of the college categories we computed the correlations of adjusted deviations in schooling, occupational status, and 1967 earnings across the 12 categories. These were $r = .109$ between educational attainment and occupational status, $r = .505$ between occupational status and earnings, and $r = -.337$ between educational attainment and earnings. Clearly, these results do not suggest the existence of a single dimension of college quality along which one could array the several institutional types represented in our classification of colleges and universities. On the contrary our findings seem to imply that the diversity of institutions of post-secondary education is partly manifested in a diversity of effects on the several outcomes of schooling.

Summary and Conclusions

In this chapter we have described and analyzed college differences in earnings. The analysis pertains to earnings from 1965 through 1967 in the subsample of male Wisconsin high school graduates of 1957 who had some college experience between 1957 and 1964 and who were neither

in school nor in military service in 1964. Our interest in the effects of colleges stems from the argument that in higher education, specific institutional qualities and not merely the fact of college attendance, have an important bearing on one's socioeconomic life chances. While this argument has a long history, its importance has grown along with college enrollments.

We have attempted to answer five questions about the earnings of men who attend different colleges or universities. How large are the variations in earnings from one school to the next, and how do these compare to institutional differences in the chances of graduating from college or entering a high-status occupation? Do institutional environments change the way in which background, ability, or high school experiences affect earnings? To what extent do college differences in earnings represent institutional effects by way of socialization or certification, and to what extent are they artifacts of the differential selection and recruitment of students with respect to factors affecting earnings? Is the choice of which college or university to attend a mechanism by which some families pass on economic advantage to their offspring? Finally, what are the mechanisms by which colleges affect earnings, and to what extent do the effects of colleges on earnings reflect differences in institutional quality?

Only about one-twentieth of the variance in earnings occurs among the dozen categories of colleges and universities treated in our analysis. This is about the same as the percentage of variance in occupational status which occurs among colleges, but less than that in educational attainment. Since the variance in earnings among persons is quite large, so in some cases are the differences in earnings among

men who attended different colleges. For example, in 1967 mean earnings were about $8000, and a gap of more than $3500 separated the average earnings of men in the highest- and lowest-paid college categories.

In earlier chapters we developed a social psychological model of achievement which estimates and interprets the effects of socioeconomic background, ability, and selected high school experiences on educational attainment, occupational status, and earnings. If college environments have distinct effects on the process of socioeconomic achievement, these might be partly manifested in changing relationships among background variables and achievements across the college categories. However, in a large number of tests we found no statistical interaction between colleges and prior variables. Thus, among college-goers the process of socioeconomic achievement appears to work in essentially the same way, no matter what college or university a young man attends.

Slightly more than half of the variance in earnings among colleges in our sample was explained by colleges selection or recruitment of men with more or less favorable prospective earnings. After controlling relevant input variables only about one-fortieth of the variance in earnings occurred among college categories, and the difference between the highest- and lowest-earning college categories was reduced by more than $1000. Still, there remained differences in earnings among the college categories which were unrelated to social origins, ability, or high school experiences. Men who attended Marquette University or a technological college or institute earned a thousand dollars more than the average in 1967, while men earned at least $600 less than the average if they attended prestigious colleges and universities, liberal arts colleges, or Wisconsin County Teachers colleges and other marginal institutions.

In the sample of men who attended college relatively few of the variables in our model of achievement affected earnings. Some of our measures were not designed to tap propensities to earn; some variables probably exhausted their effects in the process of selecting college attenders; and men in the sample were not well along in their careers. As in the more inclusive sample we found a substantial effect of family economic status on 1967 earnings, $125, for each $1000 of father's average income in the period 1957-1960. None of the other measures of socio-economic background affected earnings. Less than ten percent of the effect of father's income on son's earnings could be attributed to the different colleges attended by sons of rich and poor families. Thus, "the old school tie" is not the connecting link between father's income and son's earnings.

Even among college-going men, high school academic performance had a large effect on 1967 earnings, about $500 for each change of a standard deviation (15 points in the total population of high school graduates). About a quarter of this effect could be attributed to the different colleges attended by men with high and low grades. Each ten points on the Duncan scale of occupational aspiration in 1957 was worth about $250 in 1967 earnings, but only a sixth of this was explained by attendance at different colleges. In all while colleges do have modest independent effects on earnings in the early career, they do not seem to account for the effects on earnings of background or high school experiences.

Colleges differ in the likelihood their matriculants will graduate and also in the jobs their graduates obtain. The influence of colleges on years or schooling and on occupational status is about as large as on

earnings, but it does not begin to account for the effects of colleges on earnings. Indeed, the effects of colleges on years of schooling, occupational status, and earnings in the early career are not highly correlated across the college categories, and there is even a slight inverse relationship between the effects of colleges on years of schooling and on earnings. This lack of consistency in the effects of colleges on education, occupation, and earnings suggests that no single dimension of institutional quality defines the effectiveness of institutions of higher education.

Footnotes

1. This chapter was prepared by Duane F. Alwin, Robert M. Hauser, and William H. Sewell. It is based in part on analyses reported in Alwin (1972).

2. In preliminary analyses we have found that father's average income has a larger effect on son's earnings among college attenders than does the average combined income of mothers and fathers, and we have used father's income rather than parents income in our analysis of college effects. It may be recalled from Chapter 3 that combined parents income was the more powerful variable among male high school graduates of non-farm origin.

3. College attended is defined as the college from which the son graduated, or, if the son did not graduate, as the first college attended. Among those who attended college this definition gives a very close approximation to the last college attended.

4. For persons at or above the ceiling on covered Social Security earnings, an appropriate algorithm was used to estimate actual earnings (see Chapter 2 and Appendix 6.1). The quality of the earnings data may vary with the proportion of cases for which it was necessary to estimate earnings in each year.

5. Results for all three years are given in Alwin (1972:211-238).

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